PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION	See Form PCT/IPEA/416
PA135773/PCT		
International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/IB2004/002403	27.07.2004	15.08.2003

International Patent Classification (IPC) or national classification and IPC

C23C8/68, C23C30/00, C09K3/14, B24D3/00

Applicant

ELEMENT SIX (PROPRIETARY) LIMITED

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 6 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
   a. ☐ *sent to the applicant and to the International Bureau)* a total of sheets, as follows:
      ☐ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

Date of submission of the demand	Date of completion of this report
18.01.2005	19.09.2005

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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/IB2004/002403

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

   ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
   - ☐ international search (under Rules 12.3 and 23.1(b))
   - ☐ publication of the international application (under Rule 12.4)
   - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

   Description, Pages

   1-7 as originally filed

   Claims, Numbers

   1-19 as originally filed

   ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐ The amendments have resulted in the cancellation of:
   - ☐ the description, pages
   - ☐ the claims, Nos.
   - ☐ the drawings, sheets/figs
   - ☐ the sequence listing *(specify)*:
   - ☐ any table(s) related to sequence listing *(specify)*:

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
   - ☐ the description, pages
   - ☐ the claims, Nos.
   - ☐ the drawings, sheets/figs
   - ☐ the sequence listing *(specify)*:
   - ☐ any table(s) related to sequence listing *(specify)*:

* *If item 4 applies, some or all of these sheets may be marked "superseded."*

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	
	No:	Claims	1-19
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-19
Industrial applicability (IA)	Yes:	Claims	1-19
	No:	Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Re Item V.

1 The following documents are referred to in this communication:

D1 : US 5 611 828 A (CELIKKAYA AHMET) 18 March 1997 (1997-03-18)
D2 : GB 1 436 945 A (BORAX CONS LTD) 26 May 1976 (1976-05-26)
D3 : US 3 935 034 A (HAYES WILLIAM J) 27 January 1976 (1976-01-27)
D4 : US 5 672 382 A (LUX BENNO) 30 September 1997 (1997-09-30)
D5 : US 6 478 887 B1 (WHITE ALYSIA CANSON ET AL) 12 November 2002 (2002-11-12)
D6 : EP 0 517 460 A (GEN ELECTRIC) 9 December 1992 (1992-12-09)
D7 : DE 41 39 956 A (ADAM OPEL) 9 June 1993 (1993-06-09)

2 INDEPENDENT CLAIM 1

2.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 1 is not new in the sense of Article 33(2) PCT.
Document D1 discloses (the references in parenthesis applying to this document): a method for making an alpha alumina-based abrasive grain comprising heating a plurality of alpha alumina-based abrasive particles in the presence of a particulate boron source, for a time, at a temperature, and under a non-oxidizing atmosphere, sufficient to convert at least a portion of the outer particle surface to metal boride (see claim1).
A temperature of greater than 1000°C is needed (typically about 1100°C to about 1400°C), although both lower and higher temperatures may also be useful (see col.13,lin. 8-40).

2.2 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 1 is not new in the sense of Article 33(2) PCT.
Document D2 discloses (the references in parenthesis applying to this document): a process for the boriding of e.g. tungsten carbide articles comprising heating the articles to a temperature of from 700 to 1100 °C in contact with a boriding composition (see claim 7; page 1, lin. 18-20).

2.3 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 1 is not new in the sense of Article 33(2) PCT.

Document D3 discloses (the references in parenthesis applying to this document): a process for the diffusion coating of carbide surfaces with boron (see col.3, lin. 7-13). In general, the diffusion coatings can be carried out at temperatures within the range of 1350° to 2500°F for times varying from 0.25 to 25 hours (see col. 2, lin. 21-23). The process is preferably carried out unter an inert gas atmosphere (see col. 2, lin.38-40).

2.4 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 1 is not new in the sense of Article 33(2) PCT. Document D4 discloses (the references in parenthesis applying to this document): a method of making superhard powders (e.g. diamond, cubic boron nitride) comprising coating the powders in a chemical gas phase deposition procedure by the aid of gas flow in motion , at a temperature between 500°C and 1200°C and a pressure below 500 Torr, at wich the gas consists of a gaseous or vaporous boron compound(see claim1; example 1b,3; col.9, lin,55).

2.5 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 1 is not new in the sense of Article 33(2) PCT. Document D5 discloses (the references in parenthesis applying to this document): a method of making a boron-containing compostion comprising contacting a cemented tungsten acrbide article with a boron-yielding material, an activator and a filler and heating the cemented tungsten carbide and the boron-yielding material to at least 800°C for at least 8 hours so as to allow boron to molecularly diffuse into the cemented tungsten carbide and form a boride layer integral with the cemented tungsten carbide (see claims 41-49).

2.6 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 1 is not new in the sense of Article 33(2) PCT. Document D6 discloses (the references in parenthesis applying to this document): a method for coating cluster compacts of polycrystalline particles of cubic boron nitride or diamond comprising depositing on said cluster compact a layer of a coating material (e.g. boron- see col.6, lin. 54-56) wich is reactive with the polycrystalline particles therein and heating the layer of coating material and particles to temperatures in excess of 700°C and most preferably 800-900°C with laser to chemically bond the layer of coating material to the particles (see col.3, lin. 27-35; claims 9,10).

3 DEPENDENT CLAIMS 2-19

Dependent claims 2-19 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and/or inventive step (Article 33(2) and (3) PCT).

The reasons are as follows: saif features are either known from D1, D2, D3, D4,D5,D6 an /or D7 (preheating step before boronizing, see claim 13) or are regarded as common and trivial possibilities for boronizing articles.